Appendix D
CHART Assessment for the
Upper Columbia River Spring-run Chinook Salmon ESU

CHART Participants

The CHART for this ESU consisted of the following NOAA Fisheries biologists: Dale Bambrick (CHART Leader), Dennis Carlson, Kale Gullett, and Lynn Hatcher. CHART members also included Ken McDonald from the U.S. Forest Service and Jim Craig from the U.S. Fish and Wildlife Service. This CHART assessment also benefitted from review and comments by the Colville Indian Tribe and the Washington Department of Fish and Wildlife.

ESU Description

The Upper Columbia River spring-run Chinook ESU was listed as an endangered species in 1999 (64 FR 14308; March 24, 1999). The ESU includes all naturally spawned populations of Chinook salmon in all river reaches accessible to Chinook salmon in Columbia River tributaries upstream of the Rock Island Dam and downstream of Chief Joseph Dam in Washington, excluding the Okanogan River. The agency recently conducted a review to update the ESU's status, taking into account new information and considering the net contribution of artificial propagation efforts in the ESU. We recently published the results of this review and concluded that Upper Columbia River Chinook salmon (including six hatchery programs) should remain listed as endangered (70 FR 37160; June 28, 2005).

Spring-run Chinook salmon in this ESU have a stream-type life history, which means that juveniles enter marine waters during their second year and return to fresh water as pre-adults, maturing during their upriver spawning run. Three independent populations of spring-run Chinook salmon are identified for the ESU: those that spawn in the Wenatchee, Entiat, and Methow River Basins. Adults returning to the Wenatchee River enter fresh water from late March through early May, those returning to the Entiat and Methow Rivers enter fresh water from late March through June. Their arrival times tend to be earlier in low flow years and later in high flow years. On their way upriver, the fish hold in deeper pools or under cover until the onset of spawning. They may spawn in the areas where they hold, or move further up into smaller tributaries. Peak spawning for all three populations occurs from August to September, though the timing is highly dependent upon water temperature. The egg incubation/alevin stage goes from August into December and emergence extends from that point into March. The juveniles typically spend one year in freshwater before migrating downstream—primarily in May

and June. Most adults return after spending two years in the ocean, although 20 to 40 percent return after three years at sea.

Recovery Planning Status

Three extant demographically independent populations of naturally spawning spring-run Chinook salmon are identified for this ESU: the Wenatchee, Entiat, and Methow River Basin population. The Interior Columbia Basin Technical Recovery Team (ICBTRT 2003 and 2005) placed these populations into a single major population grouping based on life-history type and ecological spawning zone. Recovery planning will likely emphasize the need for a viable geographical distribution of the three populations comprising this ESU (Ruckelshaus et al. 2002, McElhany et al. 2003). Subbasin assessments and plans have been completed for each subbasin through the Northwest Power and Conservation Council. Recovery planners are now using those subbasin plans and TRT products to develop ESA recovery plans. Draft recovery plans are expected by the end of 2005. The CHART considered the available subbasin plans and TRT products in rating each watershed. We anticipate that, as recovery planning proceeds, we will have better information and may revise our recommendations regarding critical habitat designation.

CHART Area Assessments

The CHART assessment for this ESU addressed four subbasins containing 15 occupied watersheds, as well as the Columbia River rearing/migration corridor. Recovery planning will likely emphasize the need for a geographical distribution of viable populations across the range of population groupings (also called "strata") in an ESU (Ruckelshaus et al. 2002, McElhany et al. 2003). The Interior Columbia Basin Technical Recovery Team (ICBTRT 2003,2005) did not identify separate major groupings/strata for this ESU due to the relatively small size of the area. Therefore, as part of its assessment the CHART considered the conservation value of each HUC5 in the context of a single population group. Information is presented below by USGS subbasin because they present a convenient and systematic way to organize the CHART's watershed assessments for this ESU and their names are generally more recognizable because they typically identify major river systems.

Chief Joseph Subbasin (HUC4# 17020005)

The Chief Joseph subbasin is located in north-central Washington and contained in Chelan, Douglas and Okanogon counties, Washington. The subbasin contains five watersheds, three of which are occupied by the ESU. These watersheds encompass approximately 817 mi^2 and 1,476 miles of streams. Fish distribution and habitat use data

from WDFW identify approximately 42 miles of occupied riverine habitat in the watershed (WDFW 2003). "However, the CHART determined that approximately 11 miles of occupied reaches in two watersheds (Jordan/Tumwater and Foster Creek) did not contain PCEs for this ESU because these reaches are located upstream of the uppermost population in the ESU (Methow River) and in areas that were likely to be of very minimal conservation value to the ESU." The Interior Columbia Basin TRT (2003, 2005) identified one demographically independent population (Methow River) occupying this subbasin. Table D1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map D1 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that one of the occupied watersheds (Upper Columbia/Swamp) warranted a high overall rating because it contained a high value migration corridor for the Methow River population connecting upstream watersheds with downstream reaches and the ocean. The other two occupied watersheds were not believed to contain PCEs for this ESU. Table D2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure D1 shows the overall distribution of ratings by HUC5 watershed.

Methow Subbasin (HUC4# 17020008)

The Methow subbasin is located in north-central Washington adjacent to the U.S.-Canada border and contained entirely in Okanogon County, Washington. The subbasin contains seven watersheds, all of which are occupied by the ESU. This watershed encompasses approximately 1,823 mi^2 and 6,726 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 202 miles of occupied riverine habitat in the watershed (WDFW 2003). The Interior Columbia Basin TRT (2003, 2005) identified one demographically independent population (Methow River) occupying this subbasin. Table D1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map D2 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watersheds in this subbasin were of either high or medium conservation value to the ESU. Of the seven HUC5s reviewed, five were rated as having high and two were rated

as having medium conservation value. The CHART also concluded that the HUC5s with medium overall ratings (Middle Methow River and Lower Methow River) contain a high value rearing and migration corridor connecting high value upstream watersheds with downstream reaches and the ocean. Table D2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure D1 shows the overall distribution of ratings by HUC5 watershed.

Upper Columbia/Entiat Subbasin (HUC4# 17020010)

The Upper Columbia/Entiat subbasin drains the eastern Cascade Range in central Washington. Occupied watersheds in this subbasin are contained in Chelan, Douglas, Grant and Kittitas counties in Washington. The subbasin contains four watersheds, all of which are occupied by the ESU (but two of these consist of a rearing/migration corridor downstream of Rock Island Dam - see Unit 5 below). The two watersheds in this subbasin with tributary habitat (i.e., tributaries to the Columbia River mainstem) encompass approximately 907 mi^2 and 3,124 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 150 miles of occupied riverine habitat in the subbasin (WDFW 2003). The Interior Columbia Basin TRT (2003, 2005) identified three demographically independent populations (Methow River, Entiat River, and Wenatchee River) occupying this subbasin. Table D1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map D3 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watersheds in this subbasin were of high (Entiat River as well as the rearing/migration corridor downstream of Rock Island Dam) and medium (Lake Entiat) conservation value to the ESU. The CHART also concluded that while the tributary habitats in the Lake Entiat HUC5 were of medium conservation value, the HUC5 still contains a high value rearing and migration corridor connecting high value upstream watersheds with downstream reaches and the ocean (see Unit 5 below). Table D2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure D1 shows the overall distribution of ratings by HUC5 watershed.

Wenatchee Subbasin (HUC4# 17020011)

The Wenatchee subbasin drains the eastern Cascade Range in central Washington and is contained in Chelan County, Washington. The subbasin contains five watersheds, all of which are occupied by the ESU. The subbasin encompasses approximately 1,328 mi^2 and

3,979 miles of streams. Fish distribution and habitat use data from WDFW identify approximately 182 miles of occupied riverine habitat in the subbasin (WDFW 2003). The Interior Columbia Basin TRT (2003, 2005) identified one demographically independent population (Wenatchee River) occupying this subbasin. Table D1 summarizes the total number of occupied reaches identified for each HUC5 watershed containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map D4 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the occupied HUC5 watersheds in this subbasin were of high and medium conservation value to the ESU. Of the five HUC5s reviewed, three were rated as having high and two were rated as having medium conservation value. Table D2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure D1 shows the overall distribution of ratings by HUC5 watershed.

Columbia River Corridor

The Columbia River rearing and migration corridor consists of that segment from Rock Island Dam downstream to the Pacific Ocean. Rock Island Dam is located near the downstream border of the Entiat River, HUC5 which was the furthest downstream HUC5 with spawning or tributary PCEs identified in the range of this ESU. Fish distribution and habitat use data from WDFW identify approximately 448 miles of occupied riverine and estuarine habitat in this corridor (WDFW 2003). This corridor overlaps with the following counties: Clatsop, Columbia, Gilliam, Hood River, Morrow, Multnomah, Sherman, Umatilla, and Wasco counties in Oregon, and Benton, Chelan, Clark, Cowlitz, Douglas, Franklin, Grant, Kittitas, Klickitat, Skamania, Wahkiakum, Walla Walla, and Yakima counties in Washington.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the Columbia River corridor was of high conservation value to the ESU. The CHART noted that this corridor connects every watershed and population in this ESU with the ocean and is used by rearing/migrating juveniles and migrating adults. The Columbia River estuary is a particularly important area for this ESU as both juveniles and adults make the critical physiological transition between life in freshwater and marine habitats (ISAB 2000, Marriott et al. 2002).

Marine Areas

NOAA Fisheries' analysis focused on freshwater and estuarine habitats upstream of the mouth of the Columbia River. While marine areas are occupied by this ESU, within this vast area the agency has not identified "specific areas within the geographical area occupied by the species . . . on which are found those physical or biological features . . . essential to the conservation of the species."

Changes to the CHART's Initial Assessments

The CHART reviewed the public and peer reviewer comments received on the Team's initial findings for this ESU as well as new information relevant to evaluating habitat areas for this ESU. As a result, the CHART changed the conservation value rating for one watershed (Upper Columbia/ Swamp Creek HUC5) within the geographical area occupied by this ESU to reflect the fact that there are no tributary habitats here but there is a high value connectivity corridor. There were no changes to the delineation of occupied habitat areas for this ESU. The proposed critical habitat designation (69 FR 74572, December 14, 2004) summarizes the comments and responses pertaining to the CHART's initial determinations for this ESU, and Tables D1 and D2 reflect the final CHART assessments.

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Table D1. Summary of Occupied Areas, PCEs, and Management Activities Affecting PCEs for the Upper Columbia River Spring-Run Chinook Salmon ESU

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)			Occupied but lacking PCEs (mi)	Management Activities**
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*		
	Chief Joseph	Foster Creek	1702000503	0	0	0	0.9	A, D, Fi
	Chief Joseph	Jordan/Tumwater	1702000504	0	0	0	4.2	A, D, F, Fi, G, R
	Chief Joseph	Upper Columbia/ Swamp Creek	1702000505	0	<0.1	31.3	5.6	A, D, F, Fi, G, R
	Methow	Lost River	1702000801	4.1	0.4	3.3	0	F, Fi
	Methow	Upper Methow River	1702000802	16.9	0	4.5	0	F, Fi, G, I
	Methow	Upper Chewuch River	1702000803	19.4	0.5	0	0	F, Fi, R
	Methow	Lower Chewuch River	1702000804	25	3.9	<0.1	0	A, D, F, Fi, G, R, I
	Methow	Twisp River	1702000805	30.2	3.1	0	0	F, Fi, G, R, I
	Methow	Middle Methow River	1702000806	27.8	24.3	<0.1	0	A, D, F, Fi, G, M, R, I
	Methow	Lower Methow River	1702000807	5.2	29.4	4	0	D, F, Fi, G, M, R
	Upper Columbia/ Entiat	Entiat River	1702001001	17.4	18.4	10.8	0	F, Fi, G, R, I
	Upper Columbia/ Entiat	Lake Entiat	1702001002	0	1.1	53.8	0	A, D, F, Fi, G, M, R, U
	Upper Columbia/Entiat	Columbia River/Lynch Coulee	1702001003	0	0	29.2	0	A, D, F, Fi, G, M, R
	Upper Columbia/Entiat	Columbia River/Sand Hollow	1702001004	0	0	19.4	0	A, D, Fi, G, M
	Wenatchee	White River	1702001101	24	2.7	7.7	0	F, Fi
	Wenatchee	Chiwawa River	1702001102	37.9	11.4	1.7	0	F, Fi, R
	Wenatchee	Nason/Tumwater	1702001103	35.1	14.9	0	0	D,F, Fi, R
	Wenatchee	Icicle/Chumstick	1702001104	2.9	9	<0.1	0	A, D, F, Fi, G, M, R, U
	Wenatchee	Lower Wenatchee River	1702001105	4.2	28.8	1.2	0	A, D, F, Fi, G, I, M, R, U
	Moses Coulee	Rattlesnake Creek	1702001204	0	0	0.8	0	A, D, Fi, G, R
	Upper Columbia/Priest Rapids	Yakima River/Hanson Creek	1702001604	0	0	34.6	0	A, D, F, Fi, G, M

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)			Occupied but lacking PCEs (mi)	Management Activities**
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*		
	Upper Columbia/Priest Rapids	Middle Columbia/Priest Rapids	1702001605	0	0	33.3	0	A, Fi, G
	Upper Columbia/Priest Rapids	Columbia River/Zintel Canyon	1702001606	0	0	48	0	A, D, Fi, R, U
	Middle Columbia/Lake Wallula	Upper Lake Wallula	1707010101	0	0	11.8	0	C, D, I, R, T, U, W
	Middle Columbia/Lake Wallula	Lower Lake Wallula	1707010102	0	0	21.7	0	A, D, Fi, R
	Middle Columbia/Lake Wallula	Upper Lake Umatilla	1707010106	0	0	20.2	0	A, D, Fi, R, U
	Middle Columbia/Lake Wallula	Middle Lake Umatilla	1707010109	0	0	17.3	0	A, D, Fi, R
	Middle Columbia/Lake Wallula	Lower Lake Umatilla	1707010114	0	0	42.3	0	A, D, Fi, R
	Middle Columbia/Hood	Upper Middle Columbia/Hood	1707010501	0	0	14.7	0	A, D, Fi, G, S, R, T
	Middle Columbia/Hood	Middle Columbia/Mill Creek	1707010504	0	0	24.6	0	A, D, F, Fi, G, R, T, I, U
	Middle Columbia/Hood	Middle Columbia/Grays Creek	1707010512	0	0	25.6	0	F, Fi, R, T
	Middle Columbia/Hood	Middle Columbia/Eagle Creek	1707010513	0	0	9.3	0	D, R, U
	Lower Columbia/Sandy	Columbia Gorge Tributaries	1708000107	0	0	25.8	0	C, D, F, R, U, W
	Multiple	Lower Columbia Corridor (Sandy/ Washougal to Ocean)	NA	0	0	117.4[v]	0	C, D, I, R, T, U, W

* Some streams classified as "Migration/Presence PCEs" may also include rearing or spawning PCEs, but the GIS data are still undergoing review to confirm additional habitat use types.

** This list is not exhaustive. It is intended to highlight key management activities affecting PCEs in each watershed. Activities identified are based on the general categories described by Spence et al. (1996) and summarized previously in the "Special Management Considerations or Protection" section of this report. Coding is as follows: F= forestry, Fi = fire activity and disturbance, G = grazing, A = agriculture, C = channel modifications/diking, R = road building/maintenance, U = urbanization, S = sand and gravel mining, M = mineral mining, D = dams, I = irrigation

[v] The Lower Columbia River from the ocean upstream approximately 46.5 miles is considered to contain estuarine PCEs, in addition to migration and rearing (ISAB 2000).

Table D2. Summary of Initial CHART Scores and Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Upper Columbia River Spring-Run Chinook Salmon ESU

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Chief Joseph	Foster Creek	1702000503	1	1	1	1	0	1	5	Moderate HUC5 score; CHART questioned PCE presence here since these habitats are upstream of Methow River and habitat is likely to be of minimal conservation value	No PCEs
	Chief Joseph	Jordan/Tumwater	1702000504	1	1	1	1	0	1	5	Moderate HUC5 score; CHART questioned PCE presence here since these habitats are upstream of Methow River and habitat is likely to be of minimal conservation value	No PCEs
	Chief Joseph	Upper Columbia/Swamp Creek	1702000505	1	2	1	1	2	1	8	Moderate HUC5 score; CHART concluded that there were very few low conservation value HUC5s since ESU as a whole has only 3 TRT demographically independent populations and limited spawning/rearing PCEs; PCEs support one TRT demographically independent population; the medium HUC5 rating pertains to reaches upstream of the Methow/Columbia confluence – reaches downstream of this confluence are a high value rearing/migration corridor. CHART noted that this HUC5 does not have tributary habitats and thus warranted elevating to a High conservation value due to it's importance as a connectivity corridor.	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Methow	Lost River	1702000801	2	3	3	1	2	2	13	Moderate-high HUC5 score; CHART concluded that there were very few low conservation value HUC5s since ESU as a whole has only 3 TRT demographically independent populations and limited spawning/rearing PCEs; PCEs in this HUC5 support one population and overlap with FEMAT key watershed for at-risk anadromous salmonids; CHART determined that spawning/rearing PCEs in this and other uppermost watersheds were of high conservation value to the ESU	High
	Methow	Upper Methow River	1702000802	2	3	3	1	1	2	12	Moderate-high HUC5 score; CHART concluded that there were very few low conservation value HUC5s since ESU as a whole has only 3 TRT demographically independent populations and limited spawning/rearing PCEs; PCEs in this HUC5 support one population and overlap with FEMAT key watershed for at-risk anadromous salmonids; CHART determined that spawning/rearing PCEs in this and other uppermost watersheds were of high conservation value to the ESU; this HUC5 also contains a high value connectivity corridor for upstream HUC5	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Methow	Upper Chewuch River	1702000803	3	3	2	1	2	2	13	Moderate-high HUC5 score; CHART concluded that there were very few low conservation value HUC5s since ESU as a whole has only 3 TRT demographically independent populations and limited spawning/rearing PCEs; PCEs in this HUC5 support one population and overlap with FEMAT key watershed for at-risk anadromous salmonids; CHART determined that spawning/rearing PCEs in this and other uppermost watersheds were of high conservation value to the ESU	High
	Methow	Lower Chewuch River	1702000804	3	2	2	1	2	2	12	Moderate-high HUC5 score; CHART concluded that there were very few low conservation value HUC5s since ESU as a whole has only 3 TRT demographically independent populations and limited spawning/rearing PCEs; PCEs in this HUC5 support one population and overlap with FEMAT key watershed for at-risk anadromous salmonids; CHART determined that spawning/rearing PCEs in this and other uppermost watersheds were of high conservation value to the ESU; this HUC5 also contains a high value connectivity corridor for upstream HUC5	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Methow	Twisp River	1702000805	3	3	2	3	2	2	15	Moderate-high HUC5 score; CHART concluded that there were very few low conservation value HUC5s since ESU as a whole has only 3 TRT demographically independent populations and limited spawning/rearing PCEs; PCEs in this HUC5 support one population and overlap with FEMAT key watershed for at-risk anadromous salmonids; CHART determined that spawning/rearing PCEs in this and other uppermost watersheds were of high conservation value to the ESU	High
	Methow	Middle Methow River	1702000806	2	2	2	1	2	2	11	Moderate-high HUC5 score; CHART concluded that there were very few low conservation value HUC5s since ESU as a whole has only 3 TRT demographically independent populations and limited spawning/rearing PCEs; PCEs support one TRT demographically independent population and some reaches contain PCEs overlapping with FEMAT key watersheds for at-risk anadromous salmonids; this HUC5 also contains a high value connectivity corridor for upstream HUC5s	Medium

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Methow	Lower Methow River	1702000807	2	2	2	1	2	2	11	Moderate-high HUC5 score; CHART concluded that there were very few low conservation value HUC5s since ESU as a whole has only 3 TRT demographically independent populations and limited spawning/rearing PCEs; PCEs support one TRT demographically independent population; this HUC5 has fewer spawning areas but contains a high value connectivity corridor for upstream HUC5s	Medium
	Upper Columbia/Entiat	Entiat River	1702001001	2	2	2	2	2	3	13	Moderate-high HUC5 score; CHART concluded that there were very few low conservation value HUC5s since ESU as a whole has only 3 TRT demographically independent populations and limited spawning/rearing PCEs; PCEs support entire spawning range of one TRT demographically independent population	High
	Upper Columbia/Entiat	Lake Entiat	1702001002	1	2	1	1	2	3	10	Moderate HUC5 score; CHART concluded that there were very few low conservation value HUC5s since ESU as a whole has only 3 TRT demographically independent populations and limited spawning/rearing PCEs; PCEs support all 3 TRT demographically independent populations; the medium rating pertains to the tributary reaches in this HUC5; the Columbia River mainstem reaches in this HUC5 downstream to Rock Island Dam are a high value rearing/migration corridor	Medium

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Wenatchee	White River	1702001101	3	3	3	2	1	2	14	High HUC5 score; CHART concluded that there were very few low conservation value HUC5s since ESU as a whole has only 3 TRT demographically independent populations and limited spawning/rearing PCEs; PCEs in this HUC5 support one population and overlap with FEMAT key watershed for at-risk anadromous salmonids; CHART determined that spawning/rearing PCEs in this and other uppermost watersheds were of high conservation value to the ESU	High
	Wenatchee	Chiwawa River	1702001102	3	3	3	2	2	2	15	Highest HUC5 score for entire ESU; CHART concluded that there were very few low conservation value HUC5s since ESU as a whole has only 3 TRT demographically independent populations and limited spawning/rearing PCEs; PCEs in this HUC5 support one population and overlap with FEMAT key watershed for at-risk anadromous salmonids; CHART determined that spawning/rearing PCEs in this and other uppermost watersheds were of high conservation value to the ESU	High

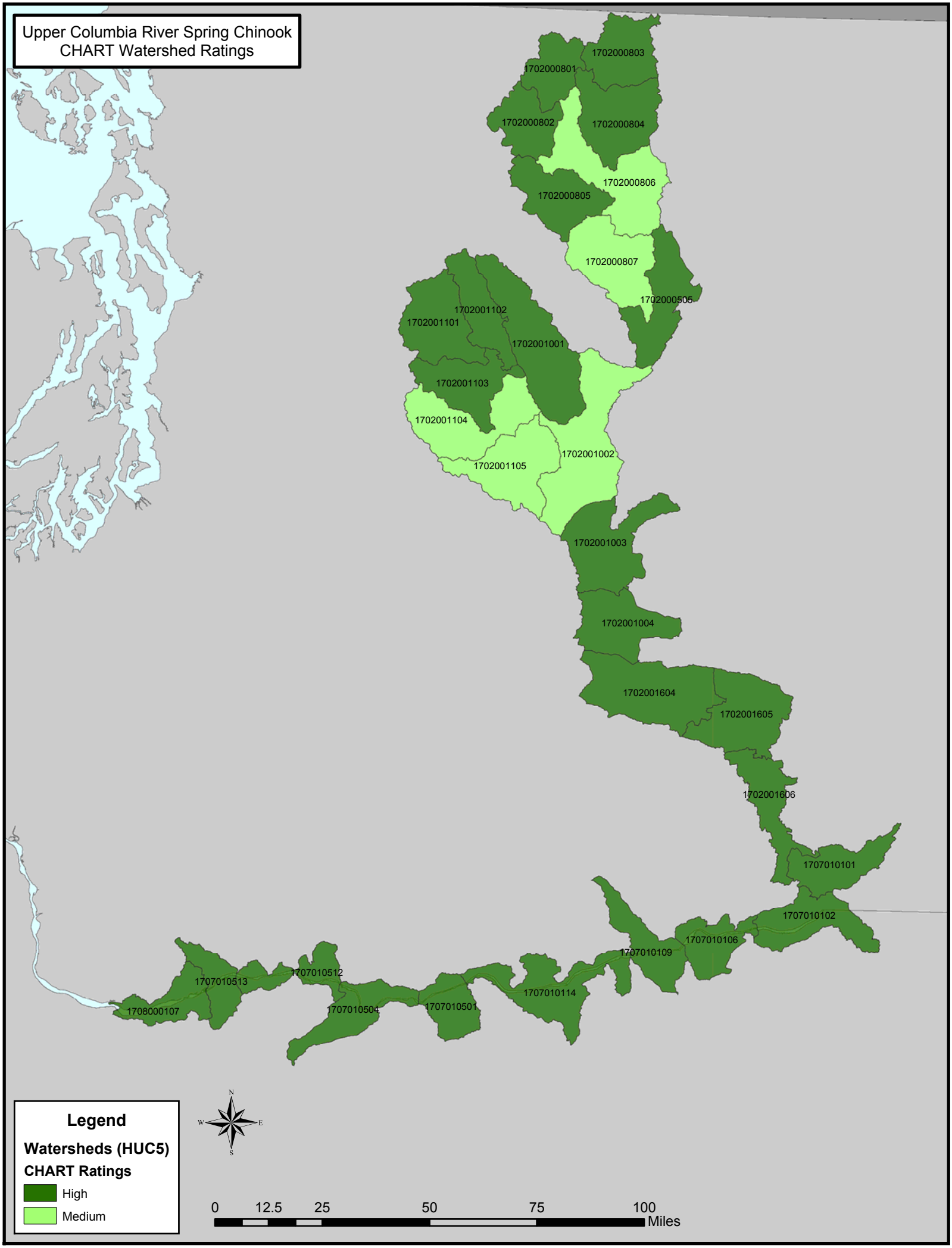
Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Wenatchee	Nason/Tumwater	1702001103	3	2	2	1	2	2	12	Moderate-high HUC5 score; CHART concluded that there were very few low conservation value HUC5s since ESU as a whole has only 3 TRT demographically independent populations and limited spawning/rearing PCEs; PCEs in this HUC5 support one population; CHART determined that spawning/rearing PCEs in this and other uppermost watersheds were of high conservation value to the ESU	High
	Wenatchee	Icicle/Chumstick	1702001104	2	1	2	1	2	2	10	Moderate HUC5 score; CHART concluded that there were very few low conservation value HUC5s since ESU as a whole has only 3 TRT demographically independent populations and limited spawning/rearing PCEs; PCEs support one TRT demographically independent population; this HUC5 has few spawning areas but contains a high value connectivity corridor for upstream HUC5s	Medium
	Wenatchee	Lower Wenatchee River	1702001105	2	2	2	1	2	2	11	Moderate HUC5 score; CHART concluded that there were very few low conservation value HUC5s since ESU as a whole has only 3 TRT demographically independent populations and limited spawning/rearing PCEs; PCEs support one TRT demographically independent population; this HUC5 has few spawning areas but contains a high value connectivity corridor for upstream HUC5s	Medium

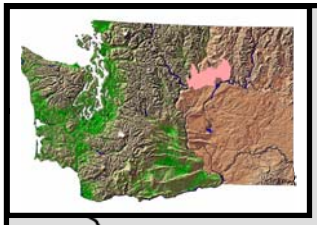
Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Upper Columbia/Entiat	Columbia River/Lynch Coulee	1702001003							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Upper Columbia/Entiat	Columbia River/Sand Hollow	1702001004							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Moses Coulee	Rattlesnake Creek	1702001204							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Upper Columbia/Priest Rapids	Yakima River/Hanson Creek	1702001604							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Upper Columbia/Priest Rapids	Middle Columbia/Priest Rapids	1702001605							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Upper Columbia/Priest Rapids	Columbia River/Zintel Canyon	1702001606							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Middle Columbia/Lake Wallula	Upper Lake Wallula	1707010101							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Middle Columbia/Lake Wallula	Lower Lake Wallula	1707010102							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Middle Columbia/Lake Wallula	Upper Lake Umatilla	1707010106							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Middle Columbia/Lake Wallula	Middle Lake Umatilla	1707010109							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Middle Columbia/Lake Wallula	Lower Lake Umatilla	1707010114							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Middle Columbia/Hood	Upper Middle Columbia/Hood	1707010501							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)						Total HUC5 Score (0-18)	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5	6			
	Middle Columbia/Hood	Middle Columbia/Mill Creek	1707010504							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Middle Columbia/Hood	Middle Columbia/Grays Creek	1707010512							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Middle Columbia/Hood	Middle Columbia/Eagle Creek	1707010513							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Lower Columbia/Sandy	Columbia Gorge Tributaries	1708000107							NS	HUC5 not scored since it is part of the migration corridor. The CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation.	High
	Multiple	Lower Columbia Corridor (Sandy/ Washougal to Ocean)	NA							NS	Area not scored since CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation	High

Figure D1. CHART Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Upper Columbia River Spring-run Chinook Salmon ESU


Upper Columbia River Spring Chinook
CHART Watershed Ratings
1702000803
1702000801
1702000802
1702000804
1702000806
1702000805
1702000807
1702000505
1702001102
1702001101
1702001001
1702001103
1702001104
1702001105
1702001002
1702001003
1702001004
1702001604
1702001605
1702001606
1707010101
1707010102
1707010106
1707010109
1707010114
1707010501
1707010504
1707010512
1707010513
1708000107
Legend
Watersheds (HUC5)
CHART Ratings
High
Medium
N
W
E
S
0
12.5
25
50
75
100
Miles



Upper Columbia Spring Chinook Distribution
Chief Joseph Sub-basin (17020005)

04

02

05

03

Nespelem

Brewster

Bridgeport

Chief Joseph Dam

Foster Creek

Belvedere

Koontzville

Elmer City

Coulee Dam

Wells

Azwell

Mansfield

Columbia River

Map D1

Legend

- Cities
- Dams
- Streams (1:100,000)

Upper Columbia Spring Chinook

- Spawning/Rearing
- Rearing/Migration
- Migration/Presence
- Occupied but Lacking PCEs

- Watersheds

Land Ownership

- Federal
- Private/Other
- State/Local
- Tribal
- Unassigned
- Water

N

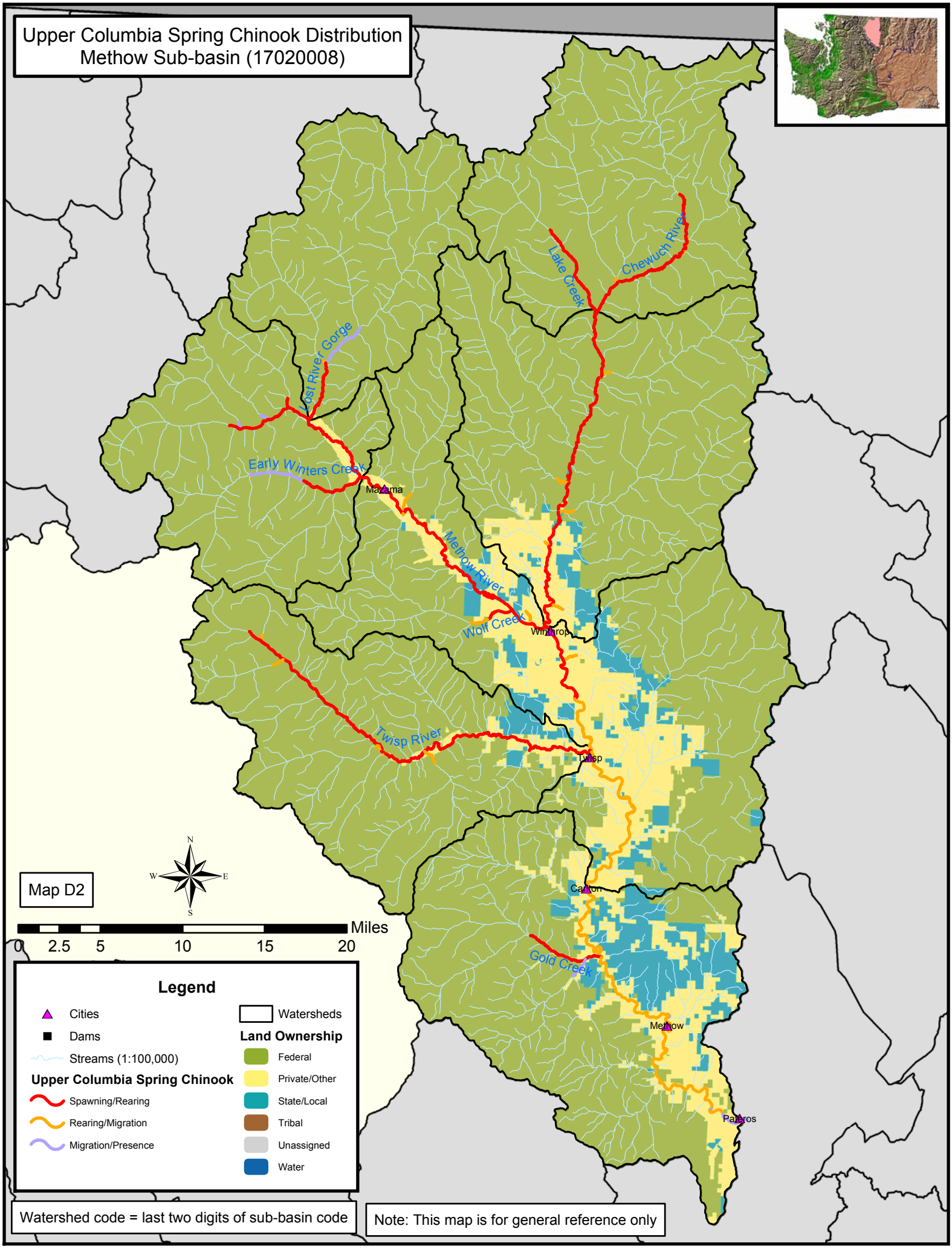
W E

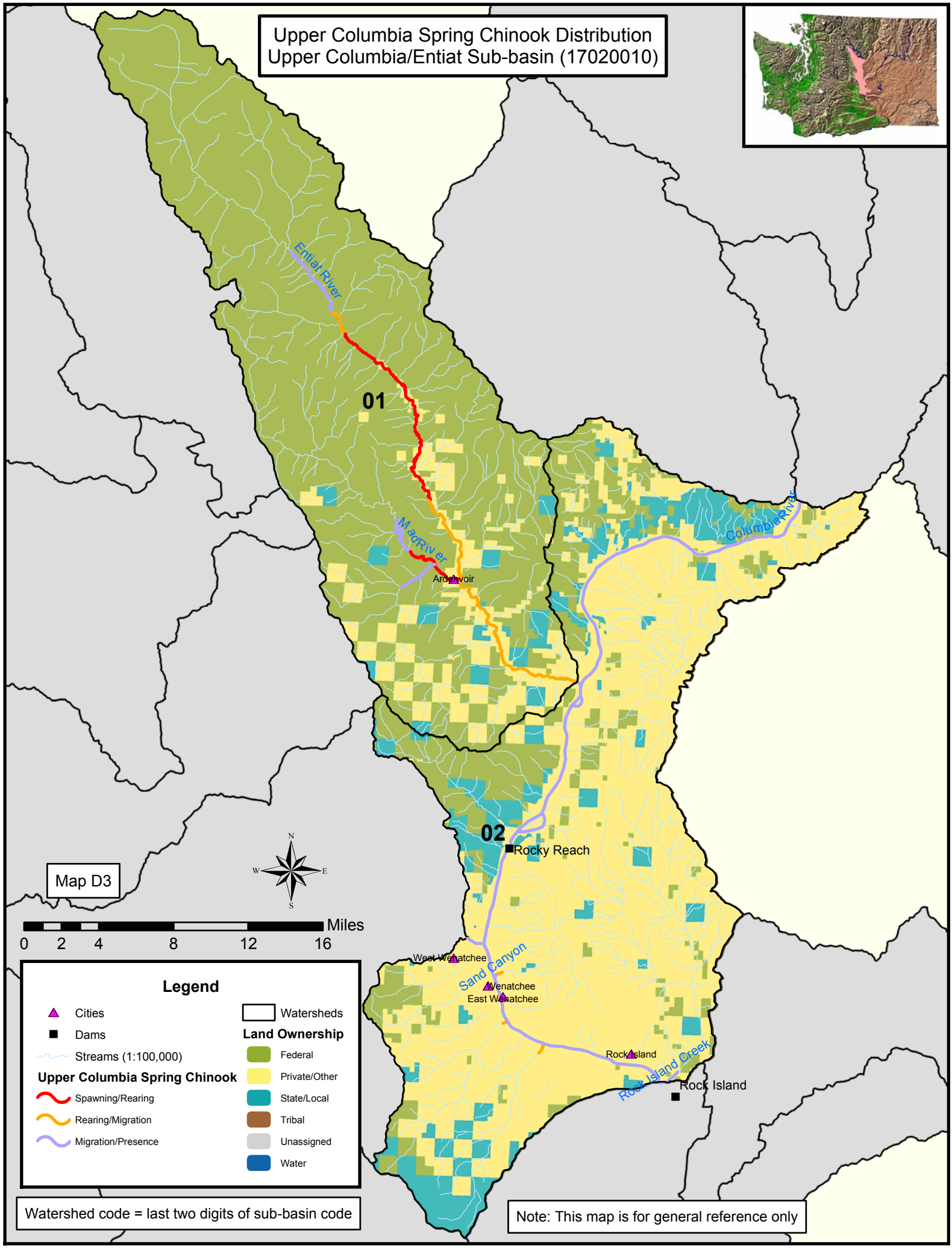
S

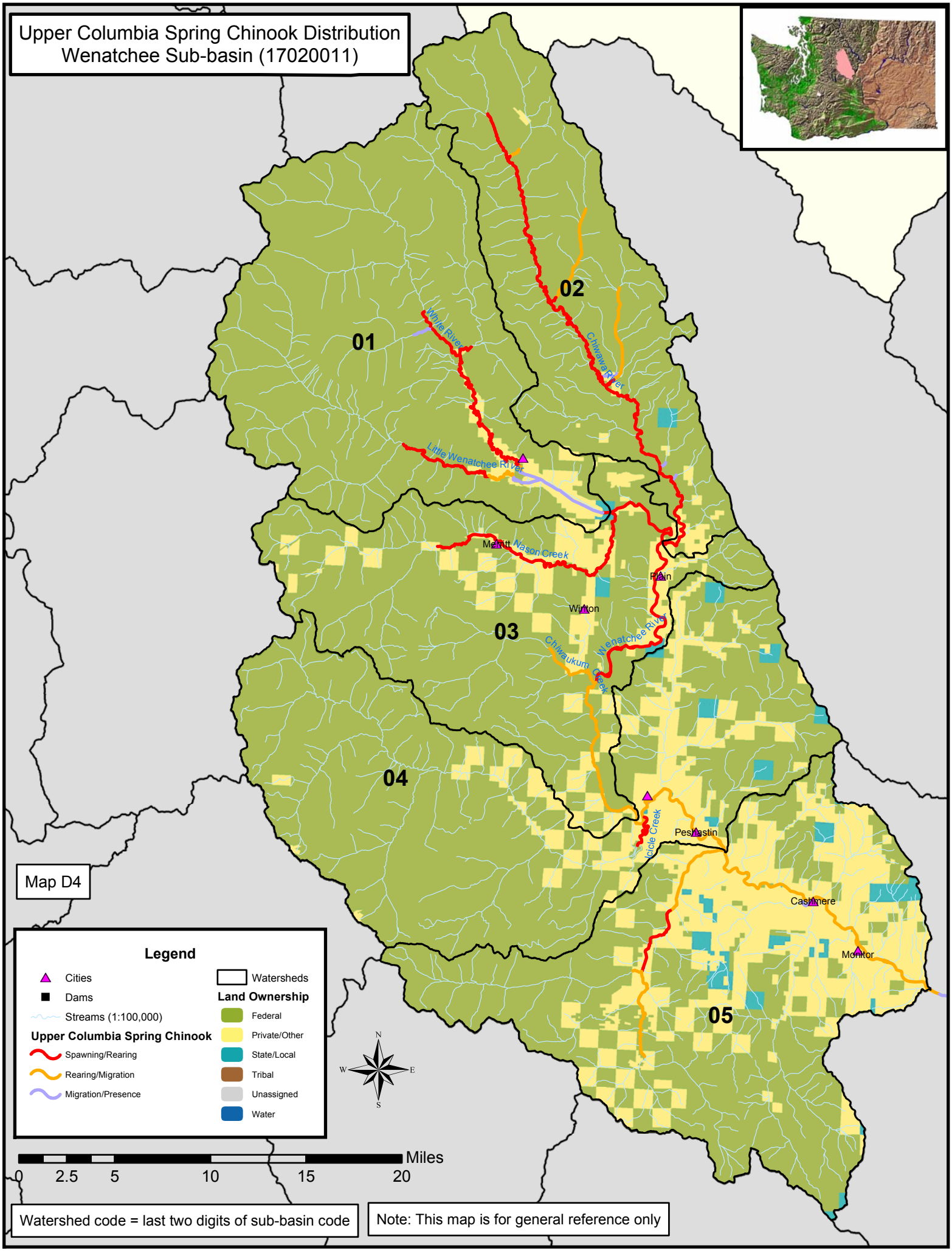
0 2 4 8 12 16 Miles

Note: This map is for general reference only

Watershed code = last two digits of sub-basin code


Upper Columbia Spring Chinook Distribution
Methow Sub-basin (17020008)
Lake Creek
Chewuch River
Lost River Gorge
Early Winters Creek
Methow River
Wolf Creek
Twisp River
Gold Creek
Mazama
Winthrop
Twisp
Carlton
Methow
Pateros
Map D2
N
W
E
S
Miles
0 2.5 5 10 15 20
Legend
Cities
Dams
Streams (1:100,000)
Upper Columbia Spring Chinook
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only


Upper Columbia Spring Chinook Distribution
Upper Columbia/Entiat Sub-basin (17020010)
Entiat River
01
Mad River
Ardenvoir
Columbia River
02
Rocky Reach
Map D3
N
W
E
S
Miles
0 2 4 8 12 16
Legend
Cities
Dams
Streams (1:100,000)
Upper Columbia Spring Chinook
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
West Wenatchee
Sand Canyon
Wenatchee
East Wenatchee
Rock Island
Rock Island Creek
Rock Island
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only


Upper Columbia Spring Chinook Distribution
Wenatchee Sub-basin (17020011)
01
02
03
04
05
White River
Chiwawa River
Little Wenatchee River
Nason Creek
Chiwaukum Creek
Wenatchee River
Icicle Creek
Merritt
Plain
Winton
Peshastin
Cashmere
Monitor
Map D4
Legend
Cities
Dams
Streams (1:100,000)
Upper Columbia Spring Chinook
Spawning/Rearing
Rearing/Migration
Migration/Presence
Watersheds
Land Ownership
Federal
Private/Other
State/Local
Tribal
Unassigned
Water
N
W
E
S
Miles
0
2.5
5
10
15
20
Watershed code = last two digits of sub-basin code
Note: This map is for general reference only